

REMARKS

New claims 44-47 are added and supported by the originally-filed application at, for example, pages 7-8. Claims 1-26 and 44-47 remain in the application. Reconsideration of the application in view of the amendments and the remarks to follow is requested.

Claims 1-6 stand rejected as being obvious over Onishi (5,383,151), Lu (5,595,928) and Fazan (article, IEDM '92). Claims 7-26 stand rejected as being obvious over Onishi, Lu, Fazan and Aoki (5,747,844).

Regarding the obviousness rejection against claim 1, such claim recites an array of memory cells occupying respective areas consumed by at least some individual memory cells within the array being equal to or less than $8F^2$, where "F" is no greater than 0.25 micron and is defined as equal to one half of minimum pitch, with **minimum pitch being defined as equal to the smallest distance of a line width plus width of a space immediately adjacent said line on one side of said line between said line and a next adjacent line in a repeated pattern within the array.**

The Examiner correctly states that Onishi fails to teach where "F" is no greater than 0.25 micron (pg. 3 of paper no. 8) and relies on Fazan to allegedly teach such limitation for modifying the Onishi invention. However, the purpose of Fazan is forming capacitors and simply provides a Table (list) of DRAM sizes to demonstrate specific compositions and structures of capacitor dielectric layers to be used with the different sized DRAMs (Table I, entitled "DRAM Trends";

column 1). DRAMs are only mentioned in the context of capacitor dielectric films (DRAMs "require high quality, ultrathin dielectric films on polycrystalline silicon (poly-Si) to meet the severe capacitance requirements imposed by continuous device scaling (col. 1, first sentence of Introduction)). The Table provides Densities, Minimum Features, Cell Areas, Capacitor Structures and Dielectrics (Table I). The Examiner states Fazan teaches "that sub-half-micron DRAM trends are for pitch values and cell areas...to increase cell density" (pg. 3 of paper no. 8). However, Fazan does not recite once "pitch" or "pitch values", and reciting "Densities" and "Cell Areas" does not provide any teaching to pitch values as any infinite number of pitch values can produce the "Densities" and "Cell Areas" provided by Fazan. Consequently, it is inconceivable that Fazan, in combination with the art of record, teaches or suggests individual memory cells where **"F" is no greater than 0.25 micron** and is defined as equal to one half of minimum pitch, with minimum pitch being defined as equal to the smallest distance of a line width plus width of a space immediately adjacent said line on one side of said line between said line and a next adjacent line as is positively recited in claim 1. The art of record fails to teach or suggest, singularly or in any combination, a positively recited limitation of claim 1. Claim 1 is allowable.

Claim 1 further recites at least some of the minimum pitch adjacent lines of memory cells within the array being isolated from one another by LOCOS field oxide formed therebetween. The Examiner incorrectly states that Onishi teaches **LOCOS** field oxide 6 (pg. 2 of paper no. 8) wherein Onishi only teaches

"element isolation regions" 6 in the context of isolation regions (col. 3, Ins. 47-49). An electronic search of Onishi confirms LOCOS is not recited once. LOCOS is a specific process (for example, see Lu) for forming isolation regions. The Examiner relies on Lu for teachings specific dimensions for LOCOS, but reliance on Lu to teach LOCOS (in combination with Onishi) fails as lacking a proper motivational rationale (pg. 3 of paper no. 8).

The Examiner is respectfully reminded that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. MPEP §2143.01 (8th edition) *citing In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). "Preferably the Examiner's explanation should be such that it provides that impetus necessary to cause one skilled in the art to combine the teachings of the references to make the proposed modification." *Ex Parte Levengood*, 28 USPQ2d, 1300, 1301, Footnote 2, (Bd. Pat. App. and Inter. 1993) (citations omitted).

The Examiner has failed to provide any motivational rationale for modifying the Onishi invention to include LOCOS field oxide formed therebetween as positively recited in claim 1. The Examiner simply states Lu teaches LOCOS is conventional, and therefore, obvious. However, just because a process may be allegedly conventional does not mean it is obvious to modify the invention of another reference to include the conventional process, there still has to be a

stated motivational rationale to modify the other invention with the conventional process as is clearly demonstrated by the above authority. The Examiner's has failed to state any explanation that provides that impetus necessary to cause one skilled in the art to combine the teachings of the Onishi to make the proposed modification. For at least reason, the obviousness rejection against claim 1 fails for lack of a required motivational rationale for the modification of Onishi by Lu.

Moreover, the Examiner is simply stating that the Onishi invention can be modified by the teachings of Lu, and therefore, it is obvious to do so, which is contrary to explicit Federal Circuit law. The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. MPEP §2143.01 (8th edition) *citing In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). Although a prior art device "may be capable of being modified to run the way the apparatus is claimed, there must be a suggestion or motivation in the reference to do so". 916 F.2d at 682, 16 USPQ2d at 1432; MPEP §2143.01; *see also In re Finch*, 972 F.2d, 1260, 23 USPQ2d, 1780 (Fed. Cir. 1992). Since no desirability of modifying the Onishi invention to include LOCOS field oxide is presented as is required by Federal Circuit law, the obviousness rejection must fail. Claim 1 is allowable.

Additionally, Applicant's background demonstrates that one skilled in the art understands that there is a teaching away to use LOCOS for DRAM cells with device pitch below 1.0 micron (claim 1 recites "F" is no greater than 0.25 micron, which equals device pitch no greater than 0.5 micron). As correctly stated by

the Examiner, Lu teaches a conventional LOCOS process (col. 4, Ins. 28-35). However, as is thoroughly discussed in the Background section of Applicant's disclosure, "as circuit density commonly referred to as device pitch falls below 1.0 micron, **conventional LOCOS techniques begin to fail due** to excessive encroachment of the oxide beneath the masking stack" (emphasis added) (pg. 2 of the originally-filed application). Accordingly, one skilled in the art would not use the teachings of Lu to conventional LOCOS to modify Onishi's invention of a DRAM cell having a device pitch below 1.0 micron (col. 4, Ins. 21-24 of Onishi). Such a modification is taught not to be available. The obviousness rejection fails.

Moreover, such a modification would destroy the Onishi invention, contrary to Federal Circuit law. The Examiner is respectfully reminded that if a proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. MPEP §2143.01 (8th Edition) *citing to In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). Pursuant to this authority, such modification of the Onishi invention is improper because the proposed modification would render the Onishi invention unsatisfactory for its intended purpose, as clearly stated in Applicant's Background section. The art is devoid of any solution to the problems discussed in the Background section. Therefore, the obviousness rejection based on the modification is improper and must be withdrawn. For this additional reason, claim 1 is allowable.

Claims 2-6 and 44 depend from independent claim 1, and therefore, are allowable for the reasons discussed above with respect to the independent claim, as well as for their own recited features which are not shown or taught by the art of record.

Regarding the rejection for obviousness against claim 7 based on the combination of Onishi, Lu, Fazan and Aoki, such claim recites "F" is no greater than 0.25 micron and is defined as equal to one half of minimum pitch, with minimum pitch being defined as equal to the smallest distance of a line width plus width of a space immediately adjacent said line on one side of said line between said line and a next adjacent line. Of the combination of art, the Examiner relies on Fazan to teach "F" is no greater than 0.25 micron. However, Fazan, as stated previously, in any combination with the art of record, fails to teach or suggest "F" is no greater than 0.25 micron and minimum pitch being defined as equal to the smallest distance of a line width plus width of a space immediately adjacent said line as positively recited in claim 7. Accordingly, the art of record fails to teach or suggest a positively recited limitation of claim 7, and therefore, claim 7 is allowable.

Claim 7 further recites adjacent memory cells being isolated from one another relative to the continuous active area formed therebetween by a conductive line formed over said continuous active area between said adjacent memory cells. The Examiner correctly states Onishi, Lu and Fazan does not teach such limitation and relies on Aoki for such teachings (pg. 3 of paper no. 8). For such alleged teaching, the Examiner directs the Applicant to an alleged

Figure 1(b) and an alleged section on "Cell Concept" of Aoki. However, Aoki does not have a Figure 1(b) nor a section on "Cell Concept", and does not teach memory cells being **isolated by a conductive line** as positively recited in claim 7. In fact, Aoki teaches conventional SiO₂ film is formed in an isolation trench 12 (col. 5, Ins. 50-60). Therefore, the art of record fails to teach or suggest another positively recited limitation of claim 7. For this additional reason, claim 7 is allowable.

Claim 7 further recites at least some of the minimum pitch adjacent lines of memory cells within the array being isolated from one another by LOCOS field oxide formed therebetween. The Examiner relies on Lu to teach such limitation, but as stated previously, the Examiner completely fails in providing a proper motivational rationale as is required for an obviousness rejection. Further, the art fails to identify or provide solutions to the problems discussed in the Background regarding device pitch below 1.0 micron and conventional LOCOS techniques. Accordingly, the obviousness rejection against claim 7 fails.

Claims 8-12 and 45 depend from independent claim 7, and therefore, are allowable for the reasons discussed above with respect to the independent claim, as well as for their own recited features which are not shown or taught by the art of record.

Regarding the rejection for obviousness against claim 13 based on the combination of Onishi, Lu, Fazan and Aoki, such claim recites "F" is no greater than 0.25 micron and is defined as equal to one half of minimum pitch, with minimum pitch being defined as equal to the smallest distance of a line width

plus width of a space immediately adjacent said line. Of the combination of art, the Examiner relies on Fazan to teach "F" is no greater than 0.25 micron. However, Fazan, as previously stated, in any combination with the art of record, fails to teach or suggest "F" is no greater than 0.25 micron and minimum pitch being defined as equal to the smallest distance of a line width plus width of a space immediately adjacent said line as positively recited in claim 13. Accordingly, the art of record fails to teach or suggest a positively recited limitation of claim 13, and therefore, claim 13 is allowable.

Claim 13 further recites adjacent DRAM cells being isolated from one another relative to the continuous active area formed therebetween by a conductive line formed over said continuous active area between said adjacent DRAM cells. The Examiner correctly states Onishi, Lu and Fazan does not teach such limitation and relies on Aoki for such teachings (pg. 3 of paper no. 8). For such alleged teaching, the Examiner directs the Applicant to Figure 1(b) and section on "Cell Concept" of Aoki. However, Aoki does not have a Figure 1(b) nor a section on "Cell Concept", and does not teach memory cells being **isolated by a conductive line** as positively recited in claim 13. In fact, Aoki teaches conventional SiO₂ film is formed in an isolation trench 12. Therefore, the art of record fails to teach or suggest another positively recited limitation of claim 13. For this additional reason, claim 13 is allowable.

Claim 13 further recites at least some of the minimum pitch adjacent lines of memory cells within the array being isolated from one another by LOCOS field oxide formed therebetween. The Examiner relies on Lu to teach such limitation,

but as stated previously, the Examiner completely fails in providing a proper motivational rationale as is required for an obviousness rejection. Further, the art fails to identify or provide solutions to the problems discussed in the Background regarding device pitch below 1.0 micron and conventional LOCOS techniques. Accordingly, the obviousness rejection against claim 13 fails.

Claims 14-17 and 46 depend from independent claim 13, and therefore, are allowable for the reasons discussed above with respect to the independent claim, as well as for their own recited features which are not shown or taught by the art of record.

Regarding the rejection for obviousness against claim 18 based on the combination of Onishi, Lu, Fazan and Aoki, such claim recites the word lines and bit lines having respective conductive widths which are less than or equal to 0.25 micron. The Examiner does not point to any teachings of the art to allege the recited limitation is taught. Moreover, the art of record does not teach such recited limitation. Since the art of record fails to teach or suggest a positively recited limitation of claim 18, such claim is allowable.

Claim 18 further recites adjacent DRAM cells being isolated from one another relative to the continuous active area formed therebetween by respective conductive lines formed over said continuous active area between said adjacent DRAM cells. The Examiner correctly states Onishi, Lu and Fazan does not teach such limitation and relies on Aoki for such teachings (pg. 3 of paper no. 8). For such alleged teaching, the Examiner directs the Applicant to Figure 1(b) and section on "Cell Concept" of Aoki. However, Aoki does not have a Figure

1(b) nor a section on "Cell Concept", and does not teach memory cells being **isolated by a conductive line** as positively recited in claim 18. In fact, Aoki teaches conventional SiO₂ film is formed in an isolation trench 12. Therefore, the art of record fails to teach or suggest another positively recited limitation of claim 18. For this additional reason, claim 18 is allowable.

Claim 18 further recites at least some adjacent lines of continuous active area within the array being isolated from one another by LOCOS field oxide formed therebetween. The Examiner relies on Lu to teach such limitation, but as stated previously, the Examiner completely fails in providing a proper motivational rationale as is required for an obviousness rejection. Further, the art fails to identify or provide solutions to the problems discussed in the Background regarding device pitch below 1.0 micron and conventional LOCOS techniques. Accordingly, the obviousness rejection against claim 18 fails.

Claims 19-21 depend from independent claim 18, and therefore, are allowable for the reasons discussed above with respect to the independent claim, as well as for their own recited features which are not shown or taught by the art of record.

Regarding the rejection for obviousness against claim 22 based on the combination of Onishi, Lu, Fazan and Aoki, such claim recites adjacent DRAM cells being isolated from one another relative to the continuous active area formed therebetween by a conductive line formed over said continuous active area between said adjacent DRAM cells. The Examiner correctly states Onishi, Lu and Fazan does not teach such limitation and relies on Aoki for such


teachings (pg. 3 of paper no. 8). For such alleged teaching, the Examiner directs the Applicant to Figure 1(b) and section on "Cell Concept" of Aoki. However, Aoki does not have a Figure 1(b) nor a section on "Cell Concept", and does not teach memory cells being **isolated by a conductive line** as positively recited in claim 22. In fact, Aoki teaches conventional SiO₂ film is formed in an isolation trench 12. Therefore, the art of record fails to teach or suggest a positively recited limitation of claim 22. For this additional reason, claim 22 is allowable.

Claims 23-26 and 47 depend from independent claim 22, and therefore, are allowable for the reasons discussed above with respect to the independent claim, as well as for their own recited features which are not shown or taught by the art of record.

This application is now believed to be in immediate condition for allowance, and action to that end is respectfully requested. If the Examiner's next anticipated action is to be anything other than a Notice of Allowance, the undersigned respectfully requests a telephone interview prior to issuance of any such subsequent action.

Respectfully submitted,

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